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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/813,430	03/20/2001	Zezhang Hou	AUD1P006	3503

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BEYER WEAVER & THOMAS LLP
P.O. BOX 70250
OAKLAND, CA 94612-0250

EXAMINER	
MICHALSKI, JUSTIN I	

ART UNIT	PAPER NUMBER
2644	

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/813,430	HOU, ZEZHANG	
	Examiner	Art Unit	
	Justin Michalski	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *5/9/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5 January 2005 has been entered.

Response to Arguments

2. Applicant's arguments regarding claims 19-21 filed 5 January 2005 have been fully considered but they are not persuasive. Applicant argues that Matouk and Castello da Costa fail to teach dynamically controlling directional processing. In response to applicant's arguments, the recitation "a method for dynamically controlling directional processing in the multi-microphone sound processing system" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

All other arguments are found persuasive.

Claim Rejections - 35 USC § 102

3. Claims 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Matouk et al. (Hereinafter "Matouk") (US Patent 5,625,684).

Regarding Claim 19, Matouk discloses in a hearing aid device having a multi-microphone sound processing device, a method for dynamically controlling directional processing in the multi-microphone sound processing system (Figure 3), said method comprising: (a) receiving first and second electronic sound signals from first and second microphones (36 and 41), respectively; (b) producing a different electronic sound signal based on the first and second sound signals when an estimated noise level is greater than a first threshold; and (c) alternatively producing a non-differential sound signal based on the first and second sound signals when the estimated noise level is less than a second threshold (Matouk discloses activation when noise is above a desired threshold (i.e. first threshold) and disabled when noise is below a desired threshold (i.e. second threshold) (Column 3, lines 43-52).

Regarding Claim 20, Matouk further discloses the first threshold is greater than or equal to the second threshold (Matouk discloses the threshold level being equal to the second threshold) (Column 3, lines 50-52).

Regarding Claim 21, Matouk further discloses the first and second microphones (36 and 41) are provided within a hearing aid device, and wherein said method is performed by the hearing aid device (Matouk discloses for use to suppress environmental noise (i.e. hearing aid) (Column 1, lines 7-9).

4. Claim 19 is rejected under 35 U.S.C. 102(b) as being anticipated by Castello Da Costa et al. (Hereinafter "Castello") (US Patent 5,740,256).

Regarding Claim 19, Castello further discloses in a hearing aid device having a multi-microphone sound processing device (Figure 1), a method for dynamically controlling directional processing in the multi-microphone sound processing system, said method comprising: (a) receiving first and second electronic sound signals from first and second microphones (21 and 22), respectively; (b) producing a different electronic sound signal based on the first and second sound signals when an estimated noise level is greater than a first threshold (adaptive filter 13 changes output based on varying values of input signals (i.e. different values for varying levels (thresholds); and (c) alternatively producing a non-differential sound signal based on the first and second sound signals when the estimated noise level is less than a second threshold (i.e. if no noise is present no canceling will take place).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-14 and 19-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ribic (US Patent 5,214,709) in view of Killion et al (Hereinafter "Killion") (US Patent 6,327,370).

Regarding Claim 1, Ribic discloses a directional sound processing system, comprising: at least first and second microphones spaced apart by a distance, said first microphone producing a first electronic sound signal and said second microphone producing a second electronic sound signal (Fig. 1a Mi1 and Mi2); a directional processing circuit operability connected to said first and second microphones, said directional processing circuit operates to activate or deactivate directional processing with respect to the first and second electronic sound signals and based on the microphone response (6 and 7). Ribic does not disclose a noise level estimate circuit operatively coupled to said first or second microphone. Killion discloses a directional processing circuit with a noise level estimate circuit operatively coupled to a first an second microphone, which produces a noise level estimate associated with the first and second microphone and is also used to activate or deactivate directional processing (Col. 7, line 50 through Col. 8, line 22). Killion further discloses that a switchable directional processing based on a noise level is helpful for noisy situation where understanding conversational speech would otherwise be difficult or impossible (Col. 3, lines 39-45). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a noise estimate circuit for enhancement of signals in noisy situations where understanding conversational speech would otherwise be difficult or impossible as taught by Ribic.

Regarding Claim 2, Ribic further discloses the noise level estimate is less than a threshold amount, said directional processing circuit deactivates the directional processing (Col. 8, lines 1-22).

Regarding Claim 3, Ribic further discloses wherein the noise level is less than a first threshold amount, said directional processing circuit deactivates the directional processing, and when the noise level is greater than a second threshold amount, said directional processing circuit activates the directional processing (Col. 8, lines 1-22; hysteresis (i.e. second threshold).

Regarding Claim 4, Killion further discloses wherein the second threshold amount is greater than the first threshold amount, and wherein when the noise level estimate is between the first threshold amount and the second threshold amount, said directional processing circuit does not change the activation or deactivation of the directional processing from its previous state (hysteresis, Col. 8, lines 20-22).

Regarding Claim 5, Killion further discloses a directional processing control circuit (Fig. 8, reference 190) operatively coupled to said noise level estimate circuit, said directional processing control circuit produces a control signal based on the noise level estimate and at least one threshold; and a signal modification circuit operatively connected to said directional processing control circuit, said signal modification circuit operates to modify the second electronic sound signal in accordance with the control signal (Col. 8, lines 1-22).

Regarding Claim 6, Ribic further discloses a combining circuit (Fig. 1a, reference 4) operatively connected to said signal modification circuit (6) and said first microphone

Mi1), said combining circuit operates to produce an output signal by combining the modified second electronic sound signal (3 and 6) with the first electric sound signal (1).

Regarding Claim 7, Ribic further discloses that is well known to build attenuating and delay elements in one of the two sound inputs enabling intermediate states ranging from bidirectional to near omnidirectional (Col. 1, lines 31-35).

Regarding Claim 8, Ribic further discloses a multiplier and scaling device (3 and 6).

Regarding Claim 9 Killion further discloses the control signal is logical (Fig. 8, comparator 190).

Regarding Claim 10, Ribic further discloses subtraction circuit 4.

Regarding Claim 11, Ribic further discloses that is well known to build attenuating and delay elements in one of the two sound inputs enabling intermediate states ranging from bidirectional to near omnidirectional (Col. 1, lines 31-35). It is also inherent that the circuits of Ribic and Killion will contain processing and transmission delays.

Regarding Claim 12, Ribic further discloses a scaling circuit (6) operatively connected to a directional processing control circuit (3 and 4), said scaling circuit operates to scale the second electronic sound signal in accordance with the control signal (7); and a subtraction circuit (4) operatively connected to said scaling circuit and said first microphone (1), said subtraction circuit operates to produce an output difference signal by subtracting the scaled second electronic sound signal from the first electronic sound signal. Killion further discloses a noise level estimate circuit (170).

Regarding Claim 13, Ribic further discloses that is well known to build attenuating and delay elements in one of the two sound inputs enabling intermediate states ranging from bidirectional to near omnidirectional (Col. 1, lines 31-35). It is also inherent that the circuits of Ribic and Killion will contain processing and transmission delays.

Regarding Claim 14, Killion discloses a hearing aid.

Regarding Claim 19, Ribic discloses a hearing aid device having a multi-microphone sound processing device, a method for dynamically controlling directional processing in the multi-microphone sound processing system, said method comprising: receiving first and second electronic sound signals from first and second microphones, respectively (Fig. 1a, microphones 1 and 2); producing a differential electronic sound signal (4)based on the first and second sound signals and a sound level (7); and alternatively producing a non-differential sound signal (attenuator 6) based on the first and second sound signals when the estimated noise level is less than a second threshold. Ribic does not disclose the differential signal based on a noise estimate. Killion discloses a directional processing circuit with a noise level estimate circuit operatively coupled to a first and second microphone, which produces a noise level estimate associated with the first and second microphone and is also used to produce directional processing based on thresholds (Col. 7, line 50 through Col. 8, line 22). Killion further discloses that a switchable directional processing based on a noise level is helpful for noisy situation where understanding conversational speech would otherwise be difficult or impossible (Col. 3, lines 39-45).

Regarding Claim 20, Killion further discloses the first threshold is greater than or equal to the second threshold (Col. 8, lines 1-22; hysteresis (i.e. second threshold).

Regarding Claim 21, Ribic and Killion disclose hearing aids.

Regarding Claim 22, Ribic discloses a method for dynamically controlling directional processing in the multi-microphone sound processing system, said method comprising: receiving first and second electronic sound signal from first and second microphones (Fig. 1a, 1 and 2); estimating a sound level picked up by at least one of the first and second microphone (7); and dynamically controlling the directional processing based on the estimated level (6). Ribic does not disclose a noise level estimate circuit operatively coupled to said first or second microphone. Killion discloses a directional processing circuit with a noise level estimate circuit operatively coupled to a first an second microphone, which produces a noise level estimate associated with the first and second microphone and is also used to activate or control directional processing (Col. 7, line 50 through Col. 8, line 22). Killion further discloses that a switchable directional processing based on a noise level is helpful for noisy situation where understanding conversational speech would otherwise be difficult or impossible (Col. 3, lines 39-45).

Regarding Claim 23, Killion further discloses comparing the estimated noise level to at least one threshold level to produce a directional processing control signal (Col. 8, lines 1-22); and controlling the directional processing in accordance with the directional processing control signal (output of 190).

Regarding Claim 24, Ribic further discloses scaling (6) the first and second sound signals in accordance with a control signal (7).

Regarding Claim 25, Killion further discloses comparing the estimated noise level to a threshold level to produce a comparison signal; and deactivating the directional processing when the estimated noise level is below the threshold level (Col. 8, lines 1-22).

Regarding Claims 26 and 27, Killion further discloses comparing the estimated noise level to a first threshold level to produce a first comparison signal; comparing the estimated noise level to a second threshold level to produce a second comparison signal, the second threshold level being greater than the first threshold level; deactivating the directional processing when the estimated noise level is below the first threshold level; and activating the directional processing when the estimated noise level is greater than the second threshold level (hysteresis, Col. 8, lines 20-22).

Regarding Claim 28, Ribic and Killion discloses a hearing aid.

7. Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ribic (US Patent 5,214,709) in view of Chu (US Patent 5,305,307).

Regarding Claim 15, Ribic discloses a first and second microphones spaced apart by a distance, said first microphone producing a first electronic sound signal and said second microphone producing a second electronic sound signal (Fig. 1a, microphones 1 and 2); a level circuit (7) coupled to the second microphone; a directional processing control circuit (7 and 6) operatively coupled to the level circuit; a

scaling circuit (6)connected to said directional processing control circuit to scale the second electronic sound signal in accordance with the control signal; and a subtraction circuit (4) operatively connected to said scaling circuit and said first microphone, producing an output difference signal by subtracting the scaled second electronic sound signal from the first electronic sound signal. Ribic does not disclose a minimum estimate circuit. It is known that there are a number of methods to estimate the amount of noise in a signal including a minimum estimator as disclosed by Chu (Col. 14, lines 20-23). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a minimum noise estimator in order to obtain the noise level of a background noise component to cancel unwanted characteristics.

Regarding Claim 16, Ribic further discloses that is well known to build attenuating and delay elements in one of the two sound inputs enabling intermediate states ranging from bidirectional to near omnidirectional (Col. 1, lines 31-35). It is also inherent that the circuits of Ribic and Killion will contain processing and transmission delays.

Regarding Claim 17, Ribic further discloses a multiplier (3).

Regarding Claim 18, Ribic further discloses a hearing aid.

8. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ribic/Killion as applied to claim 22 above, and further in view of Chu (US Patent 5,305,307).

Ribic/Killion does not disclose a minimum estimator estimates the noise level. It is known that there are a number of methods to estimate the amount of noise in a signal including a minimum estimator as disclosed by Chu (Col. 14, lines 20-23). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a minimum noise estimator in order to obtain the noise level of a background noise component to cancel unwanted characteristics.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin Michalski whose telephone number is (571)272-7524. The examiner can normally be reached on M-F 7-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571)272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

VIVIAN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

JIM
November 8, 2005